Proportionate and Adaptive Governance of Innovative Technologies (PAGIT)

PROPORTIONATE AND ADAPTIVE GOVERNANCE OF INNOVATIVE TECHNOLOGIES (PAGIT)*

CASE STUDY: RESPONSIBLE GOVERNANCE OF INNOVATIVE TECHNOLOGIES

SUMMARY REPORT

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1. Background

Innovation is expected to form the basis of national prosperity in the UK and internationally, and the UK Industrial Strategy White Paper[1] has set out ambitious plans for providing financial, organisational and structural support to the UK's most innovative sectors. However, these investments will fail to deliver the expected benefits unless they are accompanied by targeted initiatives to make governance systems more proportionate and adaptive to the needs of innovative technologies. Many regulatory systems have become expensive, time consuming, rigid and difficult to adapt to the properties of 21st century innovation particularly, but not exclusively, in the life sciences and this unaddressed barrier to translation can be seen as a waste of national resources and a drag on UK productivity that should no longer be acceptable.

The PAGIT framework[2] is designed to deal with this translational deficit while continuing to ensure safety, quality and efficacy of innovative technologies and also to take account of the UK's need to avoid regulatory challenges to future international trading relationships. It builds on three principles - the **innovation principle**, developed by the European Risk Forum[3] and subsequently adopted into EU policies[4], and the associated regulatory **principles of proportionality** and **adaptation**[5].

The governance of technologies has two components:

(i) the policy and political structures and procedures that influence decisions about which technologies are developed and when and how they should be regulated, including Responsible Research and Innovation (RRI) which provides a role for citizens and stakeholders in decision making on these questions; and

(ii) the regulatory systems that ensure the safety, quality and efficacy of products and processes, addressed by the PAGIT overall framework (see note 2) and the related case study on synthetic biology and gene editing.

The Framework includes RRI (encompassing Responsible Research (RR) and Responsible Innovation (RI) for several reasons. There are likely to be societal concerns about some disruptively innovative technologies and any new approach to their regulation, as proposed through the PAGIT Framework, will need to include specific measures to maintain public confidence. There is also dissatisfaction with current approaches to RRI and a recognised need for a new approach. Our balanced, standards-based approach to the governance of innovative technologies attempts to fill that gap.

The PAGIT Framework focuses on the disruptive or incremental nature of an innovation as the starting criteria on which to base governance decisions, defined as follows:

- **Incremental innovation** fits well with the current business model of a firm. It generates competitive advantage and contributes to the economy through more efficient use of resources, or elimination of wasteful or environmentally damaging practices. It is likely to have a pre-existing regulatory framework in place, will not lead to sectoral transformations and is unlikely to lead to stakeholder or citizen concerns or opposition.

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[1] HM Government (2017) *Industrial Strategy: building a Britain fit for the future*. Nov. 2017, Cm 9528. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/662541/industrial-strategy-white-paper-print-version.pdf)

[2] Tait, J., Banda, G. and Watkins, A. (2017) *Proportionate and Adaptive Governance of Innovative Technologies: a framework to guide policy and regulatory decision making.* Innogen Institute Report to the British Standards Institution. https://www.innogen.ac.uk/reports/1222

[3] European Risk Forum (ERF) (2015) *The Innovation Principle – Overview.* (http://www.riskforum.eu/uploads/2/5/7/1/25710097/innovation_principle_one_pager_5_march_2015.pdf)

[4] European Political Strategy Centre, (2016) *Opportunity Now: Europe's Mission to Innovate.* EPSC Strategic Notes, Issue 15, 5 July, 2016. (https://ec.europa.eu/epsc/sites/epsc/files/strategic_note_issue_15.pdf)

[5] European Political Strategy Centre, (2016) *Towards an Innovation Principle Endorsed by Better Regulation.* EPSC Strategic Notes, Issue 14, 30 June 2016. https://ec.europa.eu/epsc/sites/epsc/files/strategic_note_issue_14.pdf

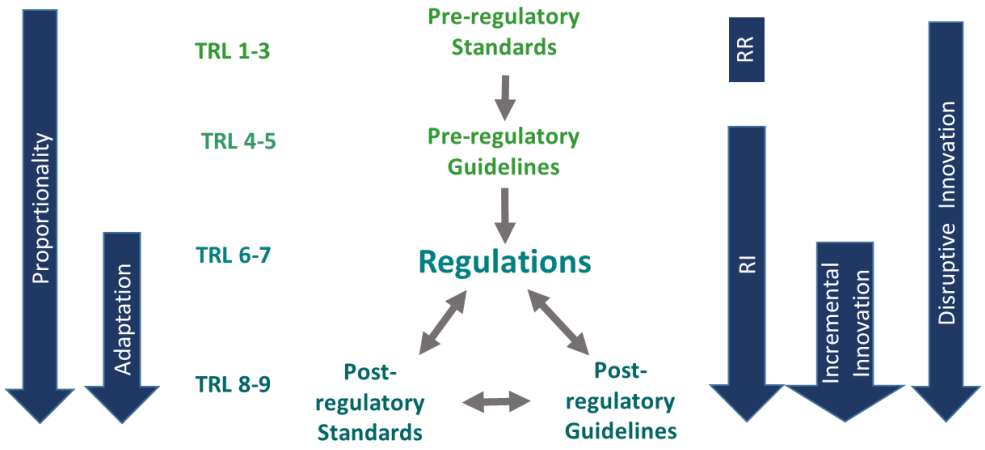
- **Disruptive innovation** involves discontinuities in innovation pathways, requires new areas of research and development, creation of new modes of production and new markets. It can lead to sectoral transformations and the displacement of incumbent companies, and the creation of entirely new sectors with significant societal and economic benefits. There may be no obvious regulatory precedent to govern potential human and environmental safety issues and in some cases it may lead to citizen and stakeholder concerns from an early stage of development. For a disruptive innovation, there may be no existing business model on which a company can build, and there may also be a need to create a new value chain, or to create a new role in an existing value chain.

Where there is potential disruption, particularly market disruption, arising from an innovative technology, it will be more likely to raise public concerns, or conversely to generate excitement and positive anticipation. This reinforces the need for companies and other players to be able to demonstrate how responsibility in innovation processes is being achieved, potentially delivered through the standards-based approach described here.

As shown in Figure 1, implementation of the PAGIT Framework is guided by Technology Readiness Levels (TRLs), ranging from 1 (early scientific research) through to 9 (market launch), with a clear demarcation at the point of 'proof of concept' (~TRL4). We use the term 'upstream' to apply to basic research stages at TRLs 1-3 (Responsible Research (RR)), and 'downstream' to refer to development phases beyond TRL 4 (Responsible Innovation (RI)) with different requirements for stakeholder engagement initiatives and different expectations of companies.

The PAGIT approach aims to achieve an equitable balance across the needs and desires of a broader range of stakeholders than current initiatives. It also recognises that upstream RR-related engagement can lead to negative framing of an innovation in the minds of citizens, a process that is then difficult to adjust at later stages of development even if new evidence on benefits and risks becomes available or if public opinion should change.

Figure 1. PAGIT Framework



The research for this project involved interviews and a workshop including participants with interests and experience in RRI, mainly on GM crops and related developments. from a range of perspectives: academic social scientists; academic natural scientists and research institute representatives; government policy makers, regulators and advisers on RRI-related questions; RRI related consultancies and think-tanks; companies working on synthetic biology-related developments; and agriculture-related organisations.

2. Critique of current RRI theory and practices

The European research programme on RRI, with over 70 million Euros of funding and strong participation from UK academic researchers, has had laudable aims, including contributing to the development of a smarter, greener economy. However, until recently most projects have focused on RR, rather than RI, resulting in a relative lack of involvement of companies and an emphasis on upstream engagement, to the relative exclusion of other aspects of development of innovative technologies, such as the different responsibility-related environment at more downstream stages of innovation.

The rigid specification and large scale of EU RRI research programmes have created an academic culture that is mainly influenced by a narrow social science agenda and a politically defined conception of 'the right impacts' to be expected from an innovative technology. The significant scale of research funding has not, as might have been hoped, fostered the emergence of a broad range of competing ideas about how to guide research and innovation on new areas of science and technology. As a result, there has been little or no engagement with the foundational concepts of RRI as specified by the EU and this is a paradigm that is ripe for challenge on the basis of its narrow political and academic origins.

The standards-based approach proposed here aims: (i) to guide upstream RR initiatives to ensure a fair and balanced consideration of the interests and values of all relevant stakeholders; and (ii) to support responsible downstream development of innovations by companies. At the downstream stages, the PAGIT approach draws on two UK initiatives: the Engineering and Physical Sciences Research Council (EPSRC) AREA approach (Anticipate, Reflect, Engage and Act)[6] and the Technology Strategy Board (TSB) (now Innovate UK) Responsible Innovation Framework[7].

3. The views of project participants

The outcomes of discussions with project participants can be summarised under the following headings.

3.1 Engagement processes

Across all discussions there were references to the distinction between 'absolutists' (those who engage from an ideological perspective) and 'rationalists' (those who engage from an interests-based perspective)[8] with a focus on the dilemmas entailed in engaging with absolutists. There was a consensus on not allowing absolutists to gain control of the dialogue and to determine the framing of an innovative technology in the minds of citizens. Equally they should not be excluded from dialogue. There was less agreement on how quickly entrenched stakeholder perceptions based on inaccurate evidence could be changed, whether it needed to be a long slow process of attrition of absolutists' influence through continued open engagement or could be a more rapid, proactive process.

Project participants proposed shifting dialogue away from absolutists' irreconcilable views on a technology *per se* to questions of 'how to take it forward' and the promotion of responsible behaviour by companies. Lack of ability to achieve a compromise in a dialogue dominated by absolutists' views, along with the general lack of interest in these questions by the majority of citizens were seen as ongoing challenges.

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[6] EPSRC (2017) *Anticipate, reflect, engage and act (AREA)*, http://www.epsrc.ac.uk/research/framework/area/, accessed 3 March 2017

[7] Technology Strategy Board (2012) *Responsible Innovation Framework for Commercialisation of Research Findings*: http://webarchive.nationalarchives.gov.uk/20130221185318/www.innovateuk.org/_assets/responsible_innovation.pdf, accessed 12 March 2017

[8] Tait, J. (2001) More Faust than Frankenstein: the European Debate about Risk Regulation for Genetically Modified Crops. Journal of Risk Research, 4(2), 175-189

The need for different points of intervention, led by different actors, involving different sets of stakeholders and different agendas was emphasised, the most obvious differentiation being between upstream RR at TRLs 1 – 3, and downstream RI at later TRLs.

3.2 Trust, transparency and evidence

Trust in regulatory systems was seen as an essential component pf public acceptance of innovative technologies, underlining the importance of including responsible governance within the PAGIT Framework. This can best be achieved by: transparency and openness; collaborative information sharing and learning between experts, stakeholders and the public; acknowledging uncertainty and disparity in knowledge between experts and the public; ensuring high quality evidence as a basis for dialogue; and trust in information sources. These were all seen as requirements to counter the biases that have been part of some engagement initiatives which have allowed exaggeration of risks and/or benefits.

Participants observed that stakeholders will tend to promote evidence that supports their point of view leading to a need to understand stakeholder motivations (including whether it is interest-based or ideological) when evaluating the quality of such evidence. The majority of participants only had experience in upstream engagement with public stakeholders and these comments are therefore most relevant to engagement on RR at TRLs 1-3. However, some participants also recognised the tension between openness and engagement and company competitive advantage and protection of intellectual property, requiring a different approach to the conduct of engagement at later TRLs.

3.3 Risks, benefits and regulation

Participants emphasised the need for equitable consideration of the benefits of an innovative technology, including the risks of not developing it, alongside any hazards to health or the environment. A focus only on risks was seen as potentially distorting citizens' framing of a technology. Participants also agreed that consideration of benefits should be delivered through engagement initiatives and not be the responsibility of regulators.

Participants also observed that public stakeholders had little understanding of the process of innovation and the hurdles that will be faced by innovative technologies throughout the development process. They were also largely ignorant of the biggest hurdle of all – the regulatory systems faced by most innovations, particularly in life science-related areas. These factors should be an important part of an engagement standard leading to improved public understanding of the regulatory systems that will influence the direction, timing and sectoral location of future innovative developments.

3.4 Politics, science and innovation

If ideological motivations underlying a dialogue are not recognised and balanced by alternative perspectives, this was expected to lead to exacerbation of conflict and politically dominated decisions on risk management and regulation. Such polarisation of views leads to the entrenched stakeholder positions based on inaccurate evidence that are expected by some to take a very long time to change. Under this heading there were strong negative comments on the EU RRI approach, questioning its usefulness and also whether it will be included in future EU research programmes.

3.5 A standards approach to responsible governance

There was strong support for a standards-based approach to responsible governance. Standards developers emphasise the need for a common language and participants observed that this is important given the tendency to misuse language as part of the process of gaining political influence on a dialogue.

Consensus standards are usually expected to be adhered to by all relevant stakeholders. However, there may be some cases where the ideal outcome for a responsible governance standard might be an agreement to allow several different standards to co-exist, for example related to organic and

conventional agriculture. This could be a basis for conflict resolution and also for introducing robustness and resilience into farming systems. However even this would be challenged by absolutists whose defining characteristic is unwillingness to consider such co-existence.

Some participants saw development of a standards approach as a welcome opportunity to slow down innovation while others saw it as needed in order to accelerate innovation processes and avoid losing the opportunity to realise its benefits. This reflects differences in perspective likely to be encountered in future engagement initiatives.

There were also divergent opinions on the value of a Corporate RI Standard as part of a responsible governance approach. Some participants felt strongly that it would be unacceptable to many academics and NGOs because of its 'corporate' emphasis. This is more likely to be an issue for upstream engagement (RR) where that standard is not expected to apply so we have continued to include it as part of the downstream approach.

4. Proposed PAGIT approach to responsible governance

The approach proposes the development of aspirational, consensus standards with the aims:

- to be demonstrably fair to all parties;
- to generate trust in the governance process for all stakeholders involved;
- to build on procedures that are already familiar to many companies, such as compliance with a Corporate Social Responsibility Standard or using a risk assessment matrix as part of conventional project management;
- to be cost-effective; and
- to avoid *unnecessary* delays in the development of innovative technologies.

Requirements for evidence of responsibility in research and innovation are most often related to developments that are seen as disruptive and, in keeping with the principle of proportionality, the standards proposed here are expected to apply mainly to that category. For an incremental innovation, there may be no need for additional oversight beyond compliance with a Corporate RI Standard. However, in some cases, societal concerns will be transferred to an incremental innovation from advocacy campaigns related to negative experiences with previous, more disruptive technologies, for example synthetic biology and gene editing and their links to earlier GM crop technologies and this would be a reason to treat such cases as if they were disruptive.

The staged approach to responsible governance has the following elements (Figure 2):

1. For **disruptive innovation** or an incremental innovation that is likely to be publicly contentious -

   (i) A **Responsible Engagement (REng) Standard** with different approaches tailored to different points of intervention:
   - Upstream, at TRLs 1 – 3, relevant to the conduct of basic research (RR);
   - Downstream, at TRLs 4 – 9, relevant to the development of innovations by companies (RI).

   (ii) The **PAGIT RI Framework**, building on the outcomes of responsibly conducted engagement initiatives, providing a standardised means to track the expected impacts of innovations.

2. For both **disruptive and incremental innovations**, beyond TRL4, **a Corporate RI Standard**.

4.1 A Responsible Engagement (REng) Standard for disruptive and related innovation

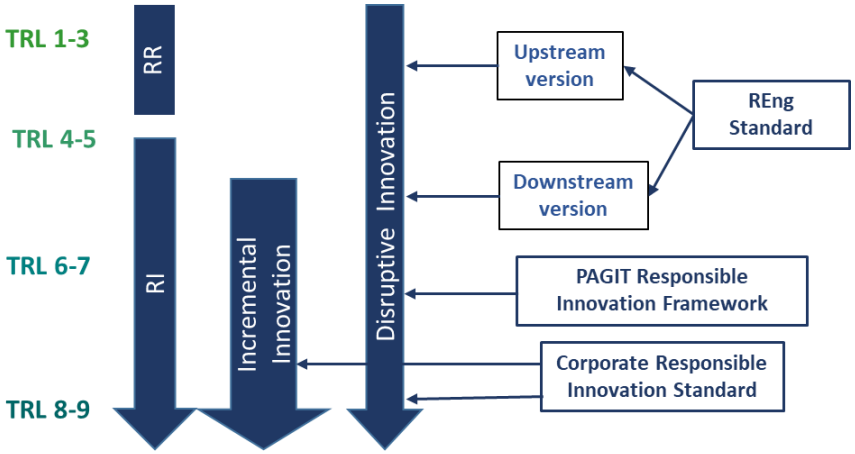
A REng Standard will have different requirements at different points of intervention, between RR (Upstream) and RI (Downstream). The guidelines outlined in Box 1 will be relevant to both upstream and downstream stages with some variation in emphasis between the two.

4.1.1 Upstream REng Standard (TRLs 1 – 3).

The RR stages are characterised by high levels of uncertainty about the future nature of an innovation, whether it is technically feasible, the resulting benefits and hazards, the industry sector that will develop it and the markets it will create or serve. It will also be difficult to engage with

citizens in a way that will be meaningful to their daily lives. This uncertainty leads to greater opportunities for either ideology- or interest-based manipulation of the available evidence, the use by some stakeholders of badly-designed experiments to create 'evidence' that does not meet expected quality standards, or the amplification of the degree of uncertainty attached to future outcomes and the unrealistic over-emphasis on future hazards or benefits. Upstream engagement can therefore have a formative influence on the public framing of an innovative technology, particularly one that is disruptive, and this framing can then persist throughout later development stages and beyond, long after most of the earlier uncertainties have been resolved.

Figure 2. Standards-based approach to responsible governance



These factors underlie the focus on the quality of the evidence used in dialogue in future engagement initiatives and the Upstream REng Standard would help to counteract the perceived political biases inherent in many RRI-related engagement initiatives.

Upstream stakeholder engagement is expensive and difficult to conduct on an impartial basis, and should preferably be undertaken by publicly funded professional bodies, not by individual companies or academic researchers or any other body that could have a vested interest in the outcome. They should include all relevant stakeholders and ensure that the innovation and its potential benefits, risks and uncertainties are understood by all.

Contrary to the views of some project participants, we propose that the outcomes of upstream engagement should not be used to delay or limit the future development of a technology, except under special circumstances to be decided as part of the development of the REng standard. Instead they should be used to focus future information gathering on relevant aspects of the technology in downstream TRLs, as 'elements' of the PAGIT RI Framework. This will require careful management of stakeholder expectations, avoiding giving the impression that the engagement will lead to specific actions, explaining the overall governance approach proposed in the PAGIT Framework, and informing stakeholders about innovation and regulatory processes (see Guidelines in Box 1).

4.1.2 Downstream REng Standard (TRLs 4 – 9)

Beyond TRL 4, there will be less uncertainty about potential benefits, hazards and future innovation trajectories, and also better-supported evidence on these issues. There will also be a broader range of stakeholders willing to engage with issues which they will see as having some relevance to their lives. Compared to upstream engagement, these stages will involve different stakeholders, discuss different types of issues and be able to come to more concrete conclusions on the development of innovative technologies.

Downstream engagement will be addressed as part of the PAGIT RI Framework, the 'Engagement' component under 'Organisational Responses' in Table 2. Engagement at these stages would involve mainly stakeholders with an interest in the new technology, using the engagement outcomes to inform innovation decisions (the 'Act' component under 'Organisational Responses').

The standards based approach would support innovators in demonstrating responsible behaviour throughout the downstream development of an innovation, including the extent to which it will fulfil the aspirations of citizens, as markets for the product and in some cases as self-appointed moral arbiters of 'the right impacts'. Compliance with the proposed standard should be seen as giving companies an aspirational advantage over competitors, should be achievable on a timescale that will not diminish their commercial competitive advantage, and be compatible with intellectual property protection. Engagement could be done by research institutes, companies or any other organisation, so long as the vested interests of the organisation are made clear and the engagement is guided by a REng standard as in Box 1.

Box 1. Guidelines for the development of a REng Standard

1. Ensure equitable treatment across all stakeholders: discussions should be open and accommodate the full range of relevant opinions; and no single perspective should dominate other opinions or dictate the terms of engagement.
2. As part of a staged approach to RRI, specific aspects of the engagement should be tailored to the relevant point of intervention to consider: who should be involved; which topics are relevant to be addressed; whether and how the outcomes should be implemented.
3. Engagement should be carefully timed: too early (upstream) and its value will be undermined by uncertainty about the nature of future developments; too late and stakeholder opinions and political positions may have become entrenched so that accommodation will be more difficult to achieve.
4. Accept that consensus may not be attainable and manage expectations accordingly.
5. Include in the dialogue the nature of innovation processes for translation of scientific discoveries to products in a market place, the relevant regulatory systems, and the constraints they will impose on innovation outcomes.
6. Ensure a balanced consideration of benefits and risks associated with innovative technologies.
7. Do not allow the values and interests of one stakeholder group to restrict the freedom of choice of others.
8. Include standards for the quality and breadth of evidence that is considered as a basis for decision making.
9. Where there are conflicting values and interests, be equitably sceptical about the impartiality of evidence presented in support of a case.
10. Where there is conflicting evidence, consider carefully the expertise of those promoting the evidence, including both scientific and experiential expertise, and weight it accordingly.

4.2 PAGIT RI Framework

For disruptive innovation, and for incremental innovations that become the subject of public or stakeholder interest, from TRLs 4 and beyond, companies can meet requirements to demonstrate responsibility using the Framework outlined in Table 1. This is designed to be simple and feasible for a company to adopt, considering the cost and timescale pressures on innovators operating in a commercial environment, incorporating elements of the RI Framework developed by UK TSB (now Innovate UK) and the EPSRC AREA approach:

- **Anticipate** – describing/analysing potential impacts relevant to the project
- **Reflect** – on purposes of, motivations for and potential implications of the project and associated uncertainties
- **Engage** – opening up visions, impacts and questioning to broader deliberation and dialogue
- **Act** – using the above processes to influence the direction and trajectory of the research and innovation process.

The 'Elements of RI' in Table 1 will include properties of the innovation (benefits or risks) that are of interest to stakeholders and to the company concerned, including any aspects identified through previous engagement based on the upstream REng Standard. The second column will be used to record any variations or new issues as they arise. The Organisational Responses relate to the conduct of REng at downstream stages of development of the innovation (Anticipate, Reflect, Engage), conducted with stakeholders with a direct interest in the development, the final column (Act) being used to record the outcomes of the engagement and the actions taken. The extent of engagement required should be proportionate to the scale and importance of the innovation concerned and a major disruptive innovation may justify having a dedicated stakeholder panel appointed for the duration of its development.

The business practice element in Table 1 relates to the need to monitor responsible behaviour of any collaborating companies or organisations involved in development of the innovation, as covered for the lead company by the Corporate RI Standard.

Table 1. PAGIT RI Framework

Elements of RI	**Issues arising during the project**	**Organisation Responses**			
		Anticipate	**Reflect**	**Engage**	**Act**
Societal Elements (positive and negative)					
Environmental Elements (risks and benefits)					
Health-related elements (risks and benefits)					
Business Practice Element					
Regulatory Elements					

This approach will be familiar to any company that uses a risk assessment matrix as part of its routine project management, updating the Framework on a regular basis so that it becomes a living document that evolves throughout the development of the innovation.

4.3 Corporate RI Standard

The proposed Corporate RI Standard is relevant to all companies developing innovative technologies, both incremental and disruptive, at downstream stages of development, beyond 'proof of concept'. It will build on the International Standards Organisation (ISO) Standard for Corporate Social Responsibility (CSR) (ISO 26000)[9] and also learn from other such standards that have already been developed.

Some participants foresaw difficulties in persuading advocacy groups and some academics to take part in an initiative with 'corporate' in the title. This type of concern is a potential indicator of an ideology-based response and, beyond TRL 4, ideologically-based perspectives are likely to be less central to discussions. Also, retaining the word 'corporate' in the title may make the standard more acceptable to the companies who will be expected to implement it.

The suggestion from a participant that a Corporate RI Standard could deliver everything that was needed in this area and was already well understood by companies mirrors the approach proposed here for incremental innovation. However, this would not be sufficient to meet the societal and regulatory challenges raised by disruptive innovations.

5. Implementing the PAGIT responsible governance approach

Some project participants questioned whether the concept of RRI was either necessary or useful and whether it would be a long term feature of future decision making on innovative technologies. Under such circumstances, the PAGIT approach could potentially fill the vacuum that would be left in this area, helping to ensure that future developments take a more proportionate and adaptive approach to encouraging innovation that is safe, effective and meets the expectations of citizens.

5.1 Upstream (TRLs 1 – 3)

For upstream innovation the starting point for decision making (Figure 3) should be to consider the extent to which an innovation is disruptive of existing business models and then whether it is likely to elicit societal concerns for some other reason. If the answer to either of these questions is 'Yes', it is advisable for a body with the relevant authority to undertake stakeholder engagement based on the REng Standard (upstream version).

5.2 Downstream (TRLs 4-9)

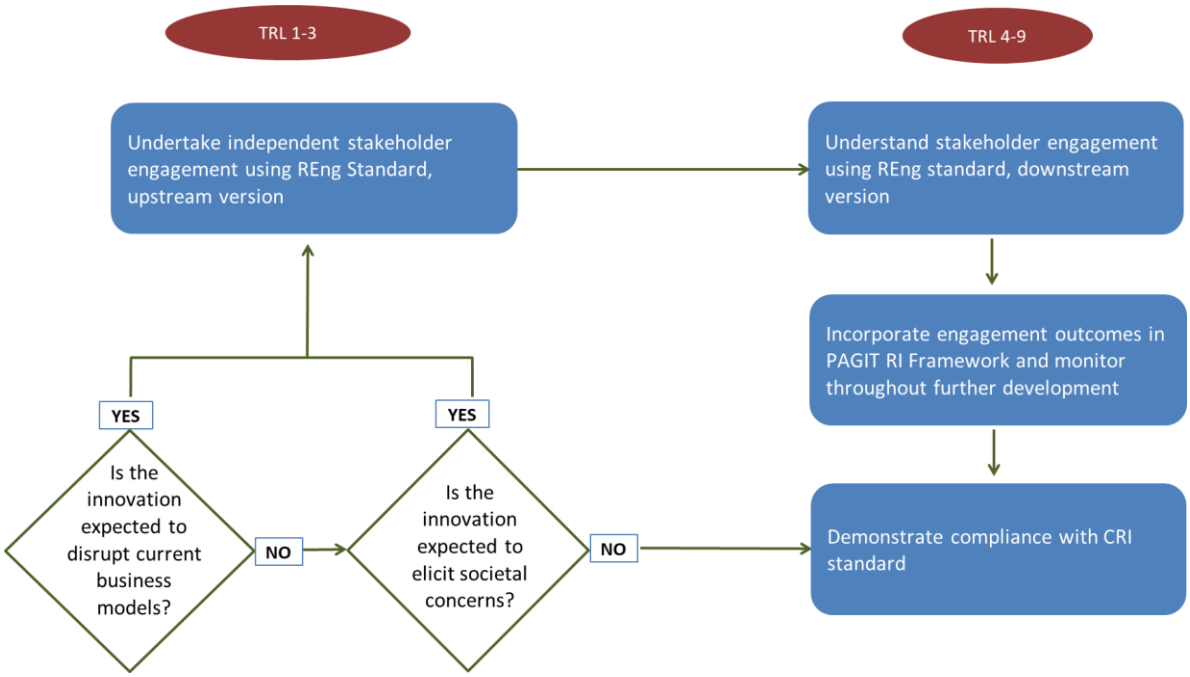
If the answer to these questions is 'No' (Figure 3), at downstream TRLs 4 – 9, compliance with the Corporate RI Standard, implemented through the company's standard operating procedures, should be sufficient in most cases to demonstrate responsible governance, in keeping with the principle of proportionality. Where an innovation is expected to have important elements of disruption at some points in relevant value chains, following from an upstream engagement initiative, companies should:

(i) As built into the RI Framework, undertake stakeholder engagement (downstream REng Standard) and take any necessary actions.
(ii) Monitor the staged development of the innovation, using criteria ('elements') derived from an upstream engagement initiative, using the PAGIT RI Framework (Table 1);
(iii) Demonstrate compliance with the Corporate RI Standard;

This approach should take account of the extent to which disruptive innovation can experience major changes in properties and outcomes, including potential hazards and benefits, during the later stages of its development.

[9] https://www.iso.org/iso-26000-social-responsibility.html

Figure 3. Using the PAGIT responsible governance approach



6. Recommendations for future developments

6.1 BSI or recognised standards body

Consider development of a set of standards, under the heading 'Corporate Governance of Innovative Technologies', building on the analysis in this report, including:

- Responsible Engagement Standard, upstream and downstream versions, including the proposed Guidelines (Box 1)
- A Standardised RI Framework
- A Corporate RI Standard

6.2 UK Research Funders

At TRLs 1 – 3, consider the need to undertake engagement initiatives, based on a REng Standard (upstream version), where funded research is likely to give rise to disruptive innovation, or to incremental applications that may be societally contentious. Such initiatives should be undertaken by an independent public body and/or a commercial market and opinion research specialist, avoiding involvement, other than as stakeholders, of academic researchers with career-related interests, commercial companies with financial interests, or any organisations with advocacy/ideological interests in outcomes.

6.3 Innovate UK and funders of downstream translational research projects

Beyond TRL 4, consider encouraging involvement of companies applying for innovation-related funding in adoption of the standards-based approach to responsible governance:

- For incremental innovation, based on adoption of the Corporate RI Standard;
- For disruptive innovation and for innovations likely to be publicly contentious, based on (i) the REng Standard (downstream version); (ii) the PAGIT RI Framework; and (iii) the Corporate RI Standard.

6.4 Companies

At TRLs 1 – 3, where a stakeholder engagement is being undertaken by an independent body, take part as one of the key stakeholders whose interests need to be considered.

Beyond TRL 4, consider adopting the requirements of the PAGIT responsible governance approach as part of the standard operating procedures of the company, including all three standards-based components: (i) the REng Standard (downstream version); (ii) the PAGIT RI Framework; and (iii) the Corporate RI Standard.